DOCUMENT RESUME

ED 420 673 TM 028 348

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TITLE Discrete Choice Modeling (DCM): An Exciting Marketing Research Survey Method for Educational Researchers.
PUB DATE 1998-04-00
NOTE 8p.; Paper presented at the Annual Meeting of the American Educational Research Association (San Diego, CA, April 13-17, 1998).
PUB TYPE Reports - Evaluative (142) -- Speeches/Meeting Papers (150)
EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Marketing; Regression (Statistics); *Research; Scoring; *Surveys
IDENTIFIERS *Choice Behavior

ABSTRACT

Discrete Choice Marketing (DCM), a research technique that has become more popular in recent marketing research, is described. DCM is a method that forces people to look at the combination of relevant variables within each choice domain and, with each option fully defined in terms of the values for those variables, make a choice of options. DCM provides more reliable and valid results than do its more simple survey relatives because it more closely resembles the environment in which people really do make choices. DCM studies are initiated by identifying the options from which people must choose, the variables that will have an effect on the choice, and the values those variables do and can take. Market scenarios should not exceed 15 options, and each option should not have more than 15 variables. Because of the need to show people scenarios, DCM is best accomplished in either an in-person setting or on the telephone. When interviews are completed, the results are typically analyzed using multinomial logistic regression models. The main advantage of DCM is that it forces people to confront situations that closely resemble the real world. The major limitation is that it is extremely difficult to calculate individual utility scores for each respondent, and the value of such calculations is still questioned. Results from DCM are therefore not as useful as some other techniques for segmentation studies, (Contains nine references.) (SLD)

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ED 420 673

Discrete Choice Modeling (DCM): An Exciting Marketing Research Survey Method for Educational Researches

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This paper is prepared for the:
Annual Meeting of the American Educational Research Association in San Diego, CA
April 1998

DISCRETE CHOICE MODELING (DCM): AN EXCITING MARKETING RESEARCH SURVEY METHOD FOR EDUCATIONAL RESEARCHERS

Paper presented to American Educational Research Association (Special Interest Group on Survey Research), April 14, 1998

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Two years ago, several of us within this SIG were lamenting the lack of cross fertilization among methodologists within different social science disciplines. We vowed to do what we could to increase the flow of information about methods being used successfully in non-educational social science fields that could be exported more fully to educational research.

This paper is a first step on my part to meet this commitment, and it examines a research technique that has become more and more important within *marketing research* over the past few years. This technique is, "Discrete choice modeling," or "DCM."

The purpose of the paper is not to delve deeply into the mathematics that underlie DCM. A body of published information within marketing research journals and other places meets that need. Rather, the purpose here is to introduce DCM in terms of:

1. The historical issues that have led to the need for DCM;
2. How DCM studies are administered;
3. Results that DCM studies provide;
4. Advantages of DCM; and
5. Limitations of DCM.

Historical Context of DCM

Since the start of social science, researchers have tried to determine the *factors that underlie human behavior*, the *relative importance of the contributing factors*, and the *likelihood that people will act in certain ways given certain opportunities to act*. Marketers care about these issues because predictive knowledge about human behavior will lead to improved product/service positioning and maximum sales and profitability. Educational researchers care about these issues because they facilitate the design of effective educational programs and the administration of cost effective educational institutions.

Survey researchers, for at least the past 100 years, have asked people to indicate directly what is most important to them in influencing their behavior, and to indicate how likely they are to do certain things. For example, students may be asked the following sort of question:

Which **one** of the following is **most** important in your decision regarding which college you will attend?

a. ___ Distance from home
b. ___ Cost of tuition
c. ___ Reputation of school
d. ___ Parents' opinions
e. ___ Whether friends attend

Issues like the one addressed by the above question can be asked about directly in a variety of ways: (1) "Pick the **one** most important. . . ."; (2) "**Rank** the options from 1-5 with. . . ."; (3) "Please rate **each** of the five options from 1 to 5. . . ."; etc.

Students may also be asked to indicate the *likelihood* of enrolling at various colleges. One might ask, for example:

How likely are you to enroll at the following schools?

	Certain	Very Likely	Somewhat Likely	Not Likely
a. College A	→	→	→	→
b. College B	→	→	→	→
c. College C	→	→	→	→
d. College D	→	→	→	→

And, of course, there are a variety of other ways the above issue could be asked about directly: "Will you enroll, 'yes' or 'no'?"; "On a scale of 1-10 where '1' means you will 'definitely not enroll' and '10' means you will 'definitely enroll,' how likely. . . ?"; etc.

For years, the above "direct" methods of inquiry have come under attack. Some critics claim that people cannot accurately ascertain the key drivers of their behavior, and that asking them directly to say what is most important does not yield valid (or, even, reliable information). These critics espouse the use of "derived measures" to assess what is important in determining human behavior. Commonly, regression analysis (or other analytical techniques based on regression-type logic) are advocated whereby the dependent variable of interest is assessed against a wide variety of independent variables collected by the survey. For example, in student evaluations of instruction, the dependent variables might be satisfaction levels (or, performance ratings) of many attributes of the teacher, and these might be regressed against overall satisfaction with (or, rating of) the teacher. The conclusion is then drawn that large beta values indicate key drivers of high satisfaction with teacher.

In fact, an intense debate has raged within marketing research circles about the proposed merits and demerits of the "stated" (i.e., "direct") and "derived" methods of assessing importance in customer satisfaction studies.

Similarly, market researchers have known for years that people do not do what they say they will do with any high degree of reliability. Researchers within the packaged goods industry often use weights to adjust consumers' statements of what they *say* they will do

to more accurately predict what experience has shown consumers most likely *will* do in regard to purchasing packaged goods. Such weights as the below are commonplace, and usually vary based on the empirical database that individual companies maintain:

Stated Behavior	Times Weight	Equals
"Definitely will buy"	.76	Actually buy
"Probably will buy"	.28	Actually buy
"Don't know"	.08	Actually buy
"Probably won't buy"	.03	Actually buy
"Definitely won't buy"	.01	Actually buy

In summary, researchers have been sufficiently troubled by people's abilities to reliably state what drives their behavior and their inability to predict their own behavior that they have spent much energy trying to "correct" the direct reports that people make via surveys.

One of characteristic shared by most of the "old" methods is that they ask people to think of variables one at a time, and to make judgement about them in isolation of other variables. Most of the decisions humans make are not made in this way. Rather, people typically assess a variety of options by examining the pros and cons of each and weighing the relative importance of these pros and cons. In other words, people make "trade offs," and select the option(s) that provide the best perceived utility.

"Discrete choice modeling" (or, "DCM") is a method that forces people to look at the combination of relevant variables within each choice option and, with each option fully defined in terms of the values for those variables, make a choice of options. As such, DCM provides more reliable and valid results than do its more simple survey relatives because it more closely resembles the environment in which people actually do make choices.

How DCM Studies Are Administered

DCM studies are initiated by identifying the options from which people must choose, the variables that will have an effect on their decision, and the values those variable do (or can) take. The options are then presented as "market scenarios." An example is shown below:

Scenario

College A	College B	College C
Within 50 miles of home	200 miles from home	1400 miles from home
Small, private school	Large, state university	Ivy League school
$19,000/year	$6500/year	$28,000/year
Friends attend	No friends attend	No friends attend

The "options" are the colleges with their packaging of variables and values; the variables are "distance from home," "type of school," "tuition," and "whether friends attend." The

values are allowed to vary from option to option. In the above example, assume they represent the actual state of affairs.

A simple DCM study might ask only about the actual states of affairs and, if people only had the three options listed above and all the relevant decision variables are shown above, only this one scenario would be needed. However, things are rarely that simple. If a college wished to determine the factors that drive decisions among all its applicants (or all those considering the college, or all those who quickly ruled out the college), a more typical DCM situation would unfold. Such a situation would require many more scenarios. Each scenario could still have only three options within it, but the number of colleges shown could increase, and the values for given colleges could be varied (e.g., in some options College A might have no friends attending, and in other options the price of tuition might be varied—if such a thing could actually happen in reality).

Obviously, sound preliminary qualitative research is needed to insure that all relevant variables (along with all realistic values for those variables) have been identified. Once this work is done, the market options and scenarios are assembled using fractional factorial designs or random designs so that conclusions can be drawn about all options even though few, if any, respondents will have been presented with them all. Being sure that the preliminary qualitative research is done well, and designing the options and scenarios are the toughest aspects of a DCM implementation.

Market scenarios should not exceed 15 options, and each option should not have more than 15 variables. These guidelines can be exceeded but to do so adds severe complexity to an already complicated procedure.

Once the scenarios have been finalized, the number that needs to be shown to each respondent is determined and the scenarios are randomly assigned to the respondent base.

Because of the need to show people scenarios, DCM is best accomplished in either an "in-person" setting or by use of a "phone-mail-phone" methodology (to recruit, mail scenarios, and conduct interviews). In designs where everyone sees and selects from all scenarios, sample sizes of 125 are often large enough to provide statistically stable results. If only a subset of scenarios is shown to each person, the sample size needs to be larger. (If only 'z' of 'y' scenarios are shown, the sample should be at least '125 x y/z'.)

When the interviews are completed, the results are typically analyzed using multinomial logistic regression models.

Results Produced by DCM

The types of information that DCM produces include the following:

- Specific option (of those presented) that is most often chosen, percentage of people who choose it, rank ordering of other options, percentage of people who choose each other option;

- Relative importance of each variable in driving decisions;

- Optimal configuration of variable values to attract maximum selection;

- Effect on selection caused by varying variable values—not only effect of given option but influence on other options as well

In addition to providing predefined outputs, DCM results can be programmed into computer simulators so that researchers can see the effects of changing whatever variables they may which to change.

Advantages of DCM

As noted earlier, DCM has one major advantage over traditional methods used to assess choice and influence: it forces people to confront situations that more closely resemble the real world, where tradeoffs need to be made. Other choice methods also exist. The most commonly used is "conjoint analysis" which, in reality, is an umbrella term under which many types of choice-based research fall. (In fact, some writers have referred to DCM as "choice-based conjoint analysis.") The advantages of DCM over "typical" conjoint methods are:

- Not all values need be shown for all options. (In many conjoint methods, each option must, at some time, be shown with all variable values—even though those values may make little sense for that option);

- DCM allows respondents to reject all options shown ("I would not choose any of those options"), which further exemplifies the real world nature of DCM;

- DCM allows respondents to proportion their selection—i.e., it does not require all or none choices ("I'd spend 30% of my resources on Option A, and 70% on Option B," or "For my personal use I'd choose Option D, but for my business use I'd choose Option B").

- Data obtained from DCM can be extrapolated to estimate effects on choice options that contain variable values not asked about during the actual interviewing.

Limitation of DCM

The major limitation of DCM is that it is extremely difficult to calculate individual utility scores for each respondent, and the value of such calculations is still questioned. This means that the results from DCM are not as useful as are some other techniques for segmentation studies. Also, the complexity noted above in designing such studies, and the time and cost needed to do so, often prevent the use of DCM even though it may be the best research method for the situation.

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